PHYSICAL MATHEMATICS SEMINAR

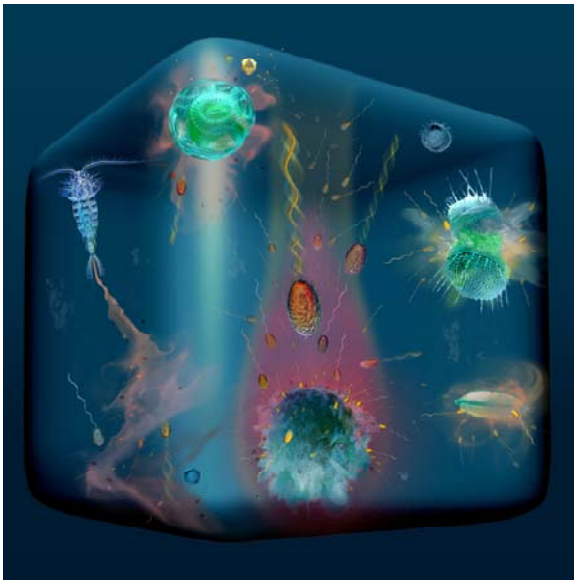
GRADIENTS, TAXIS, AND THE LIFE OF A MARINE MICROBE

ROMAN STOCKER

Massachusetts Institute of Technology

ABSTRACT:

It is now widely recognized that microbes drive the biogeochemistry and determine the productivity of the oceans. At the level of individual microbes, the ocean is a sea of gradients, to which cells respond by directional motion, or 'taxis'. Chemical gradients define heterogeneous resource landscapes and lead to chemotaxis, while flow gradients exert forces and torques on organisms and cause gyrotaxis. Our understanding of these interactions - both chemical and fluid mechanical - has been hampered by the difficulty of observing microbial behavior at appropriate spatiotemporal scales, and by a lack of mathematical models addressing the ecological consequences of morphology, motility, flow and the quest for nutrients in this micro-world. Modern microfluidic and millifluidic tools afford unprecedented access to this regime, providing data that in turn feed new models of microbial behavior. I will demonstrate this combined approach by discussing bacterial chemotaxis and phytoplankton gyrotaxis in the ocean.



TUESDAY, MAY 10, 2011
2:30 PM
Building 2, Room 105

Refreshments at 3:30 PM in Building 2, Room 290

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